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# The Origin, Character, and Decline of an Early Civilization

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## INTRODUCTION

The Harappan civilization which arose in the Indus River Valley toward the end of the third millennium before Christ (2300 B.C. to 1700 B.C.) can be regarded as the first of the manifestations of civilization to occur outside western Asia and Egypt. Since geographical remoteness tends to eliminate direct contact as the probable reason for its existence, its origins, character, and demise are therefore of no little scientific interest. Its very remoteness should allow us, in almost clinical fashion, to analyze this civilization as a cultural manifestation the complexities of which are obscured only by the necessarily incomplete archeological record. The primary nature of the phenomena of civilization that characterizes the past 5000 years of human existence can be reasonably probed if we utilize the opportunity presented to us in the extensive remains of the Harappan civilization. A beginning of such an examination has been made and is the purpose of continued researches by a number of scholars. On the basis of present research we may ask and expect qualified answers to questions as to the origins, character, and decline of the Harappan civilization. The evidence at hand indicates that we are obtaining a much clearer picture than has hitherto been available, a picture that reveals a great deal as to the mechanisms by

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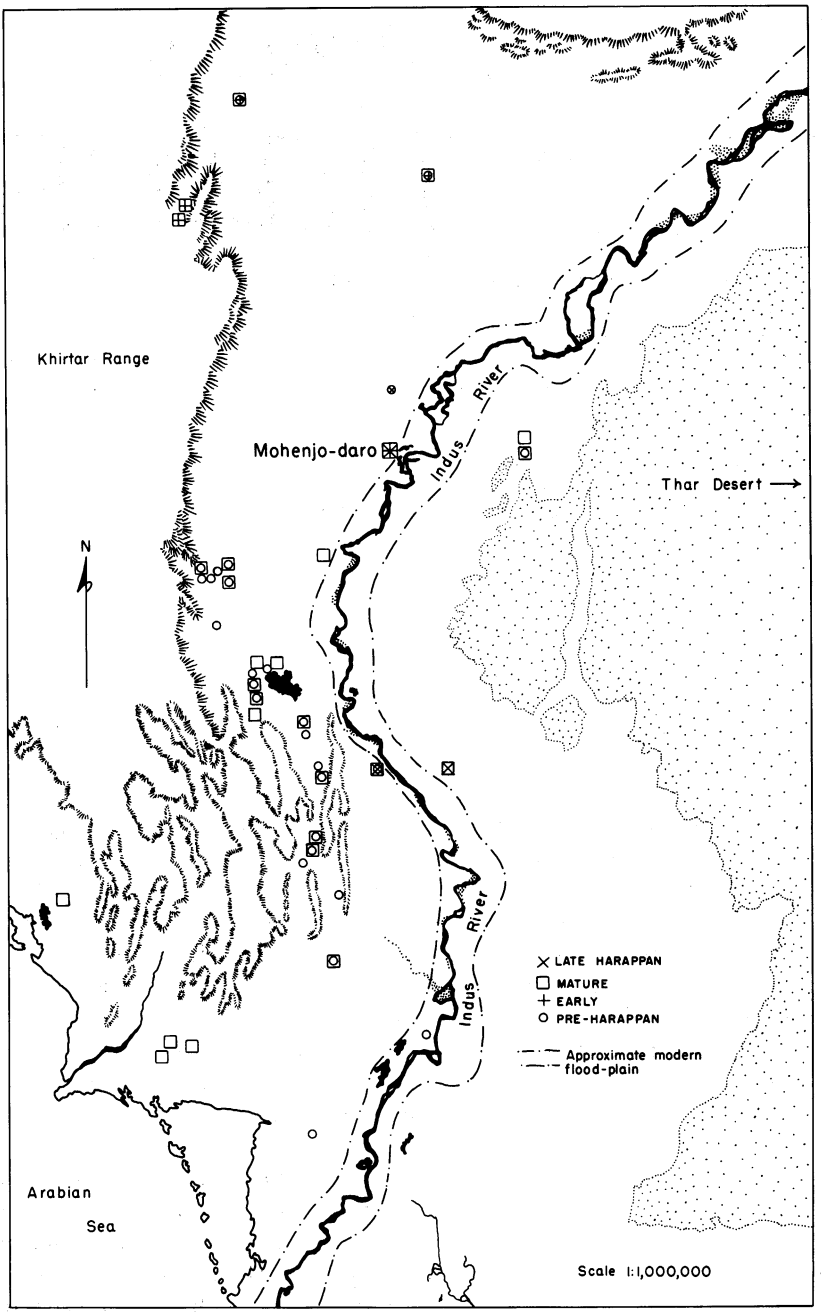


FIG. 1. Outline map of Sind on the lower Indus River Basin, showing the location of pre-Harappan and Harappan sites and their relative chronological position.

which a civilization may have developed and by which its character and history are specifically determined.

The present paper is an attempt to summarize some of the possibilities inherent in the newer archeological record. It is based on recent efforts made during three field seasons, 1959–1960, 1961–1962, and 1964. Its principal aim is to provide broader views of the problem than those normally found in the literature. The evidence seems capable of a number of interpretations; it is timely perhaps to view it from the point of view of new perspectives.

This paper owes much to discussions with Mr. Gregory Possehl, graduate student at the University of Washington. Part of the funds for the field work on which this paper is based were received from the Bollingen Foundation, the Wenner-Gren Foundation, the National Science Foundation (Grant GS-533), and the Public Law 480 Program of the United States Department of State and the Graduate Research Fund, University of Washington. My wife drew the illustrations.

## THE SETTING

The Indo-Iranian Borderlands consist essentially of that portion of the eastern Iranian plateau that lies south of the Koh-i-Baba ranges of central Afghanistan as far as the Arabian seacoast, including the southern Punjab and Sind portions of the Indus River Valley. Baluchistan lies at the heart of the Borderlands and serves as the link between the Seistan Basin at the boundaries of Iran and Afghanistan, southern Iran, and the Indus River Valley which is in West Pakistan and is subcontinental in character. The Borderlands consist largely of desert-mountain terrain, nine-tenths of which is barren most of the year. Annual rainfall ranges from almost nothing in Seistan to less than 8 inches in eastern Baluchistan. In contrast to the barren terrain of the Makran, Kharan, and Chagai or western portions of Baluchistan, much of eastern Baluchistan, especially the old states of Las Bela and Kalat and the districts of Zhob, Loralai, and Quetta-Pishin, are characterized by sources of riverine water, springs, and perennial wells. As a result the population of Baluchistan is mainly situated in the east, on and about patches and ribbons of productive alluvial land.

The Indus River Valley is an enormously fertile alluvial plain. In spite of riverine vagaries and human misuse, it is one of the best agricultural regions of the world and is the backbone of the modern state of West Pakistan. Its flat, generally featureless plain contrasts with both the mountainous country of Baluchistan on the west and the sandy hills of the Thar, or Great Indian Desert, which bounds it on the east (fig. 1).

The Indo-Iranian Borderlands are therefore not unsuited to human settlement; in fact they are much better endowed for this purpose than most of the Iranian plateau. The moderately fertile uplands of eastern Baluchistan and southern Afghanistan form the western boundaries of the Indus River alluvial plain. The evidence indicates that the interaction of the inhabitants in the uplands and those in the plain was essential to the development of civilization in the subcontinent.

## ORIGINS

More than a decade ago Sir Mortimer Wheeler, dean of subcontinental archeology, pointed out that researches among the Indo-Iranian Borderlands were like philately. Investigators caught up in a maze of decorated potsherds representing the village cultures of late prehistoric time were guilty of creating schemes that summarized the story of that critical period and region as if it were simply an arrangement of sets of stamps in a collector's album.

However, since Wheeler made this statement, we have seen much progress in archeological research in the Borderlands. Where, at one time, every survey and excavation more often than not produced new materials unexpected by researchers, we have now reached that stage at which the material uncovered by archeologists is repeating itself. The stratigraphic sequence and the typological relationships of artifact assemblages are falling into a pattern at once locally meaningful and, in the larger perspective, of significant importance to the study of ancient civilization. Among the more important recent researches, those of the following should be noted: Beatrice de Cardi, central Baluchistan; Jean-Marie Casal, excavations at Mundigak (southern Afghanistan), Amri (southwest Sind), and Nindowari (southern Baluchistan); George F. Dales in Makran; Walter A. Fairservis, Jr., and associates in Quetta, Zhob-Loralai, southern Afghanistan, Seistan, southwest Sind, and Las Bela; F. A. Khan at Kot Diji, Bhawalpur; R. L. Raikes in surveys of Kachhi, Isplenji, southern Baluchistan, and Las Bela; Henry Field in Makran and Bhawalpur; A. Ghosh, B. B. Lal, and B. K. Thapar in Bikaner and northern India; and S. R. Rao in Gujarat. Related work by V. M. Masson in Turkmenistan also has a bearing.

Five major stages of development are emerging. Many details are missing, but the broad outline can be summarized with reasonable accuracy. It bears directly on the origin of the Harappan civilization and is somewhat surprising, since it suggests a somewhat unexpected degree of independent development of that civilization.

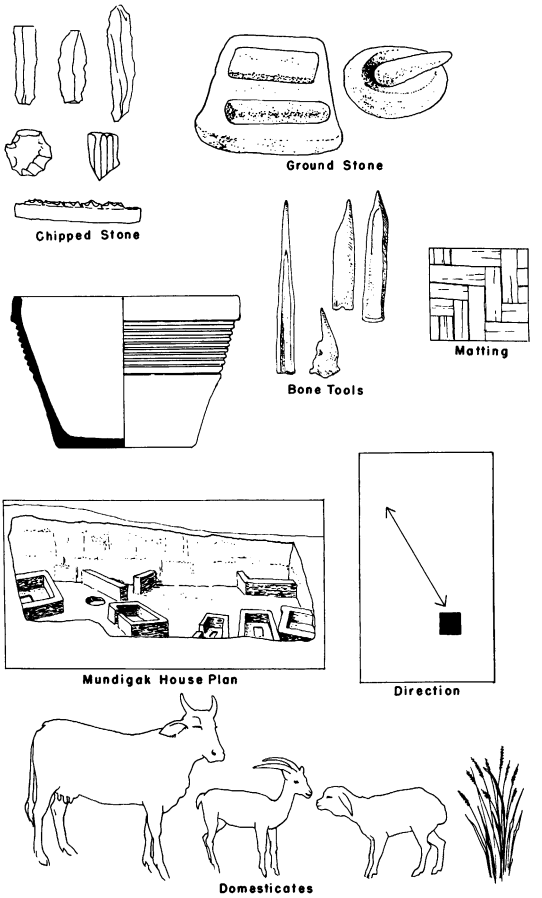


FIG. 2. Stage I, pastoralism with limited cultivation. The rectangle outlines direction or the movement to and from a typical village. Pastoralism and cultivation are given equal value, with some emphasis toward the former. Villages are occupied seasonally.

## STAGE I: PASTORALISM WITH LIMITED CULTIVATION

Figure 2

The evidence for Stage I, as yet poorly known, indicates that a people having domesticated cattle, sheep, and goats and a limited cereal agriculture were settled in parts of the Indo-Iranian Borderlands. They possessed a flake-blade, stone-tool industry which included sickle blades, gouges, and arrowheads. They also used ground-stone implements. Bone needles or awls are attested. Handmade pottery, often basket-marked

and in some cases crudely painted, appeared in this stage, especially in its later manifestations. Reed matting was used as a floor covering. Small houses constructed of *pisé* or crude bricks produce a sense of impermanence to this stage, suggesting that considerable seasonal movement was the practice. Hearths were inside the houses. The most recent dates for this stage are around 3300 B.C., but it may extend back well into the fifth millennium before Christ.

The stage is represented in southern Afghanistan (Mundigak Period 1, early phases), and, in northern Baluchistan, at Quetta (Kili Gul Mohammad I–II), Loralai (Rana Ghundai Ia, Sur Jangal I, Dabar Kot), and Zhob (Periano Ghundai), and in the northern part of southern Kalat (Anjira 1). This distribution suggests that the stage was concentrated in the northern region. However, flake-blade tool industries are known in southern Baluchistan (Kapoto, Wadh, Ornach) and in southwestern Sind up to the Karachi area (Jherruck, Lyari, Tharro Hill, Karachi golf course). Among these, occasional geometrics indicate a possible link to earlier "Mesolithic" food-collecting industries which are still poorly known in the subcontinent. Accordingly this stage was very likely much more widely distributed than our present evidence indicates. A detailed account of the correlations and stratigraphic relationships of the various sites of the Indo-Iranian Borderlands for this stage and later stages will be published in the near future.

The tradition bears a relationship to the Sialk I-Djeitun level of development of Iran and Turkmenistan, respectively, but is so much later, at least according to present evidence, that it appears to be a localized and long-enduring survival of that tradition. The Indo-Iranian Borderland ceramic correlations with Iran proper, for this stage and the following stages, were discussed in Bacon (1963, pp. 265–278, and especially figs. 5–9).

## Stage II: Developed Cultivation and Pastoralism; Beginnings of Regionalization

Figure 3

In this stage, the dwellings were larger and more substantial than those of the previous stage. Mud brick was fully used as a building material, as well as boulders and cut stone. Permanent village life is indicated. Stone dams, both terrace and, apparently, storage, were first employed in this stage. Copper was widely used. Ceramics were both handmade and wheelmade. Characteristic wares include red-on-black open bowls, white-on-black open bowls, and pedestal cups. Among the painted motifs on pottery are rows of ibexes and humpless and humped

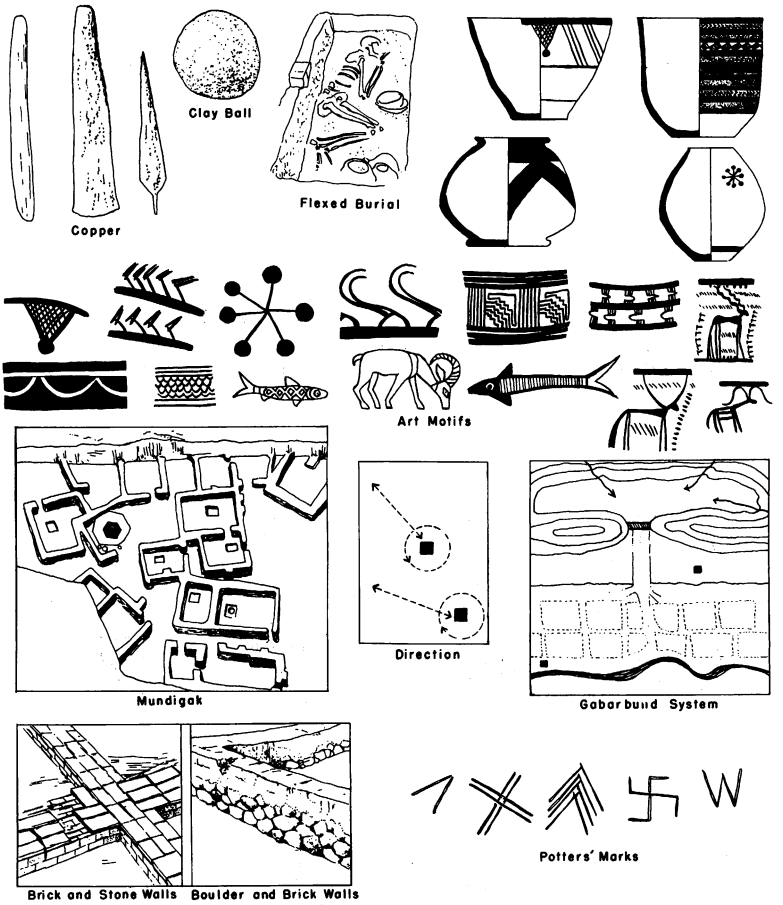


FIG. 3. Stage II, developed cultivation with pastoralism; the beginnings of regionalization. Direction indicates permanent occupation of villages, with limited pastoralism.

bulls, as well as a vast repertoire of geometric designs, most of which can be found in an earlier prehistoric context in Iran (especially in the north and northeast). Burials in or among houses were complete with funerary equipment. Potters' marks occurred, especially on the finer vessels. Goats, sheep, and cattle were herded probably much as in modern times, with seasonal movement.

In the earlier phases of this stage there seems to have been a general distribution of the same assemblage of artifacts from southern Afghanistan to central Baluchistan. However, in its later phases, distinct region-

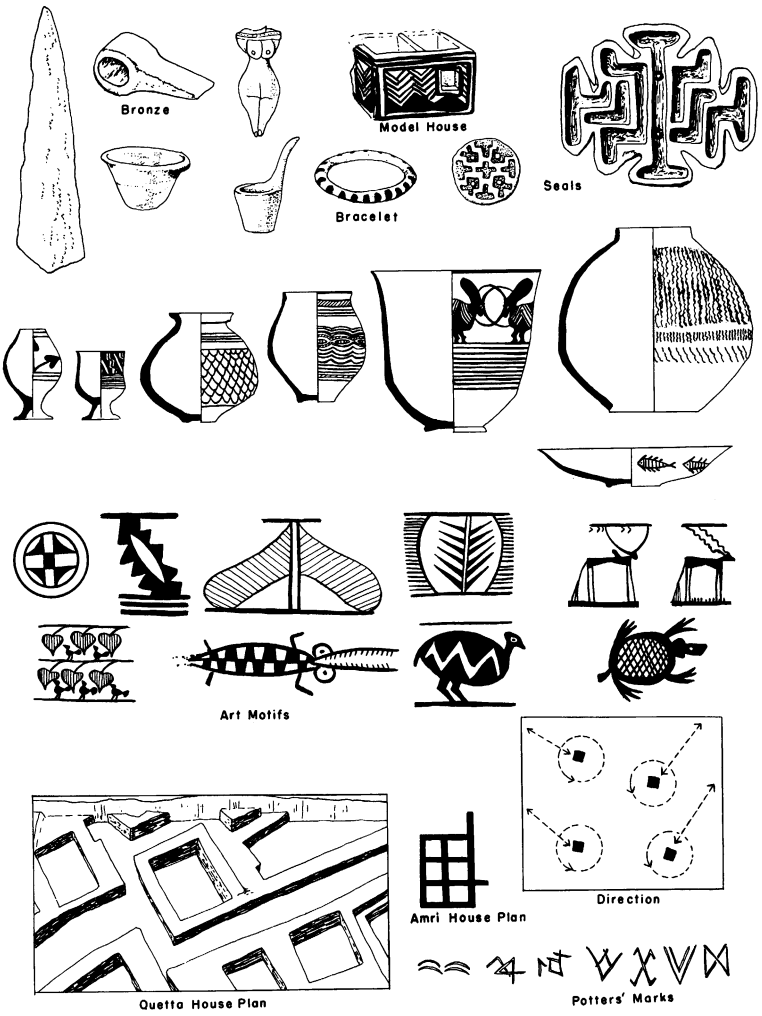


FIG. 4. Stage III, fully developed sedentary village life; regionalization continued, but there was considerable interregional contact. Direction demonstrates multiplicity of villages.

alization occurred, superficially represented in the pottery by the canister vessels decorated in polychrome or with concentric designs of the so-called Nal type prevalent in central Baluchistan and extending as far south as Kolwa and Las Bela. The fine-line Kechi Beg wares of the Quetta Valley and their equivalents in Loralai and Zhob represent

another regionalization. Burial within the houses occurred in central Baluchistan (Nal) but was absent from Quetta and southern Afghanistan. This regionalization, it must be emphasized, did not change the essential techno-economic level shared throughout the Borderlands, though individual development was most probably uneven.

The stage dates from about 3300 B.C. to about 2500 B.C. Its earlier aspect is best represented in southern Afghanistan (Mundigak Period I, late phases, and Mundigak Period II); in Baluchistan at Quetta (Kili Gul Mohammad III–IV, Damb Sadaat I), Loralai (Rana Ghundai Ib-II and Sur Jangal I–II, Dabar Kot), Zhob (Periano Ghundai, Moghul Ghundai); and in central Baluchistan (Anjira II–III). Its more recent aspects are at Nal (Surkh Damb) and, in southern Baluchistan, at Drakalo, Kolwa, Ornach, Wadh, and Las Bela. The latest phases also have been reported as having been found up to the borders of the Indus River Valley proper, in the Bolan Pass, in the upper Hab River Valley (near Diwana), and along the Khirtar mountain slopes facing Lake Manchhar as far north as Kachhi (Pandi Wahi, Ghazi Shah, Pai-jo-kotiro).

This stage reflects influences from northern Iran, especially the Chasmi Ali horizon in its earlier phases and Hissar I–IIA, Sialk III (earlier phases), in its later phases.

### Stage III: Fully Developed Sedentary Village Life; Regionalization but Interregional Contact

Figure 4

This stage represents the occurrence of the largest number of villages for almost every region of the Borderlands. The villages as a whole achieved their maximum size. Accordingly, one may suspect with reason, this was the time of maximum use of the cultivable land. A wide variety of copper and bronze pins, knives, and axes (including socketed types) is represented. Human female and cattle figurines in terra cotta were very common. Also common were compartmented seals, an elaborate system of potters' marks, alabaster vessels, and an extraordinary range of pottery forms, including pedestal vessels, plates (especially in grayware), and open-based immovable bread ovens set in the houses. The painted designs were often broad-line variants of motifs known in Stage II. There was also much emphasis on the elaboration of simple geometric forms, as, for example, in the so-called Quetta ware.

Regionalization is very apparent in this stage. From the known material it is obvious that, although the generic obligation is distinctively to northern Iran in particular, the localization of village life and the influence of a different ecology had their effect. Now we find pipal leaves,

humped Brahma bulls, cobras, birds, and fish depicted on the pottery. Remarkable are the rows of humped cattle which stand in the same stylistic fashion as the Iranian ibex of the previous stage. These emphases are superficial examples of possible qualitative changes in religion and social structure. These changes can be understood as representing a process of Indianization fully under way. In effect, the styles that brought the cultural forms into the characteristic subcontinental framework were coming into focus.

In this stage there is ample evidence that the farmers were moving out into the alluvial plain of the Indus River Valley. The Bolan, Mula, Baran Nai, Gaj, and other passes or related valleys, where village sites of Stage III have been found, provide excellent evidence of movement off the Iranian plateau. The lower levels of the site of Amri demonstrate not only the presence of settlers in the Indus Valley, but that they were already adapted to the new ecological situation. The recent excavations at that site uncovered evidence for the existence of buildings that were partitioned into small doorless compartments, which suggest aboveground superstructures—an effective living arrangement in a land of floods and heat. At Kot Diji in northern Sind across the Indus River, F. A. Khan unearthed a massive fortification of the period, one somewhat duplicated at Tharro Hill in southern Sind. Sizable settlements of this stage have been discovered as far east as northern Rajasthan by archeologists of the Archaeological Survey of India.

That the farmers of the day were capable of dealing with the demands of the land on which they lived is best proved by the presence of massive stone dams or *gabarbands* adjacent to their villages, particularly in southern Baluchistan and southwestern Sind. These structures are of two types, storage or reservoir, and more frequently *kach* or terrace dams like those of south Arabia or the Negeb (fig. 5). A discussion of the *gabarbands* of Baluchistan can be found in Dales (1962, pp. 30–39), Fairservis (1961b), and Raikes and Dyson (1961, pp. 265–281); see also Evenari, Shanan, Tadnor, Aharondi (1961, pp. 979–996).

Whereas these people share a range of artifacts that establish common generic ties and contemporary contacts, there are, nonetheless, stylistic differences proving that regionalization was maintained even within the Indus River Valley. Thus the rather austere, simple, geometric, painted designs of Kot Diji are in sharp contrast to the exuberant compositions found at Amri. Most significant is the style found in northern Sind, along the southern borders of the plain of Kachhi, and the foothills of the Khirtar Range. Apparently a localized outgrowth of the Kulli-Quetta culture styles of Baluchistan, it is characterized by such features

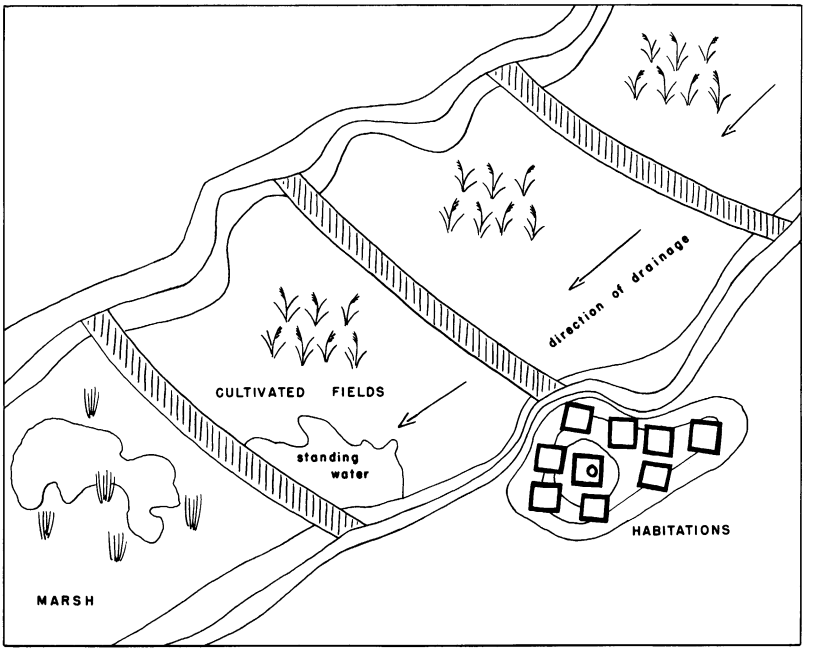


FIG. 5. Idealized drawing of a *kach* system as used in southwestern Sind in both ancient and modern times.

as unpainted terra-cotta bangles round in cross section, female and animal figurines with rather gross features, so-called "cakes" of terra cotta, and a pottery corpus closely related to that of Baluchistan. However, the painted designs on the pottery, though derived from Baluchistan, are characteristically composed in over-all patterns in which floral elements have a special place. Unfortunately, no excavator has as yet uncovered these settlements, but surface remains indicate that the villages were probably large and flourishing. The above style characterizes some of the styles of the Harappan civilization and, in fact, is known to have existed prior to the mature phase of that civilization at certain sites, including Mohenjo-daro. This provides a reason to label it Early Harappan and thus in the direct line to the so-called mature or urbanized phase of that culture.

On the present evidence this stage can be dated from about 2500 B.C. to perhaps 2300–2200 B.C. It is widely represented in the Borderlands: southern Afghanistan (Mundigak III, Deh Morasi Ghundai); in Baluchistan: Quetta (Damb Sadaat II), Loralai (Dabar Kot, Sur Jangal III,

Rana Ghundai III), Zhob (Periano Ghundai, Moghul Ghundai); in central Baluchistan (Anjira IV and surface): in Kolwa (Kulli, Mehi), Nal, Ornach, Wadh, Drakalo, Las Bela (Edith Shahr, Niai Buthi); in southwestern Sind (Amri, Kohtras Buthi, Tharro Hill), in the Lake Manchar region (Pandi Wahi, Ghazi Shah), in northern Sind and Kachhi (Gandava, Judeirjo-daro, Mohenjo-daro, Kot Diji), in Bhahawalpur (Bhut), and in Bikaner (Sothi, Kalibangan, and other sites).

It seems clear that the strong influx of northern Iranian influence continued, since the later phases of Sialk III and materials from Turkmenistan (Namazgah Tepe III) have rather precise equivalents in Baluchistan (Bacon, 1963, p. 271, fig. 78; Masson, 1960, p. 31; Piggott, 1943). However, for the first time it appears that influences from southern Iran have entered the picture. The principal occupation of the Seistan basin of the Helmand River (Fairservis, 1961a) and the basins southward (Bampur, Parom) to the Arabian seacoast took place at this time. The southern Iranian cultural style, as nearly as we can now identify it, can be found in western Makran. Some aspects are known as far as Kolwa to the east.

## Stage IV: The Period of Urbanization

Figures 6, 7

The characteristic feature of this period of urbanization was a monumental building situated on the highest part of a mound or other elevation, natural or artificial. Usually it was surrounded by a wall, and a well or drain at the highest point of the structure was a feature. In some cases the buildings were multiple structures. On the lower slopes of the mound or in the surrounding area, or both, formal structures such as baths or rooms set in rows were situated. At Mundigak in Afghanistan an elaborate pillared facade more than 20 meters long occurred in front of a monumental building set high on the site. At Damb Sadaat in the Quetta Valley a platform, with drains, was situated at the top of the site. A disarticulated human skull was found in a cache in one corner of its foundation. In Las Bela, Complex A of the site group Edith Shahr represents an almost continuous complex of stone structures along the Porali Valley above the fertile zone of Welpat. These massive structures dominate the narrow valley north of the cultivated plain. Such large structures are known in Kolwa, Drakalo, and the Ornach, as well as in Zhob and Loralai.

Pedestal figurines of goggle-eyed women with prominent breasts and wearing heavy necklaces, and painted figurines representing cattle, are typical of the period. The present evidence suggests burial in cemeteries.

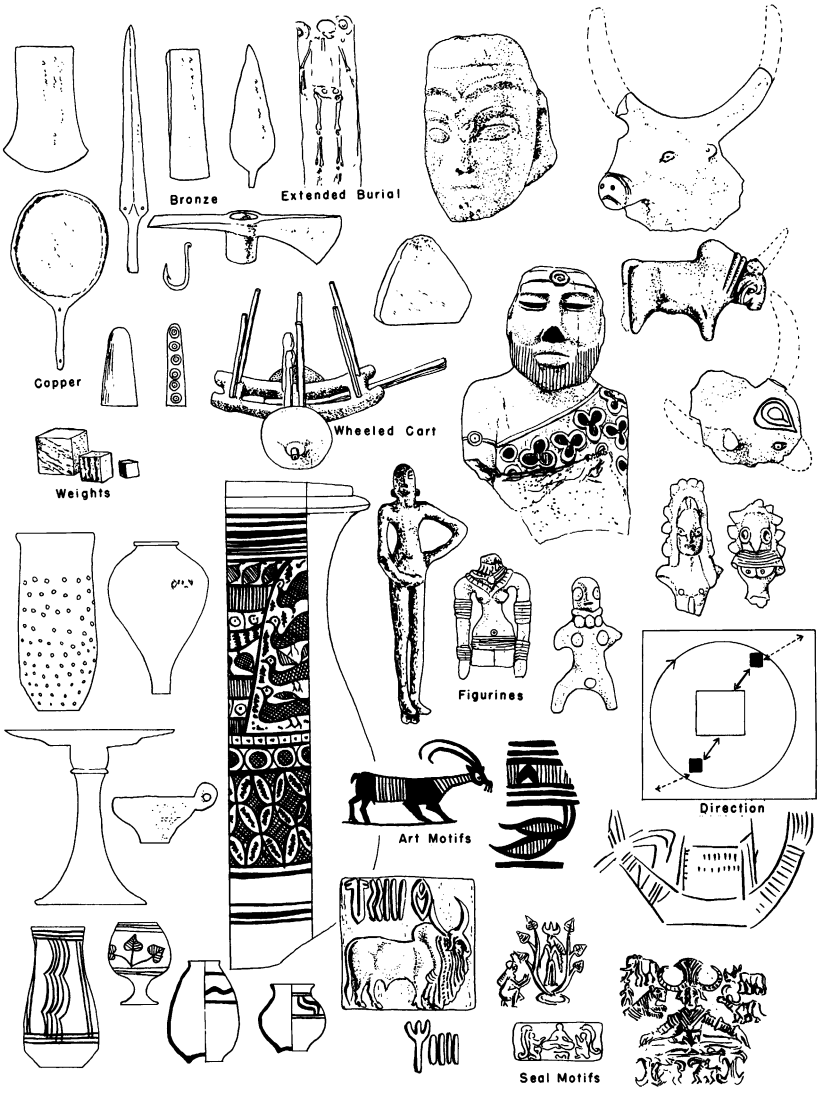


FIG. 6. Stage IV, the period of urbanization. Direction emphasizes movement from villages to urban centers for special activities and return. Limited pastoralism.

Pottery tends to be heavy. Though painted motifs characteristic of the earlier period occur, they tend to be exceedingly stylized. In the Late Kulli pottery (in southern Baluchistan principally) scenes are painted,

and the typical horizontality of the decoration of the earlier wares is less obvious. As in the earlier stage, clay bangles, beads in lapis lazuli, carnelian, agate, serpentine, steatite, and other stones, clay and steatite seals, copper and bronze implements, alabaster vessels, ground stone, flake-blade tools, and bone and ivory ornaments were common. The weaving of bast fibers and perhaps cotton is indicated.

The settlement patterns of the time suggest that there were areas such as northern Las Bela where complexes of monumental structures were separated from the farmers' villages. The latter were in the midst of the

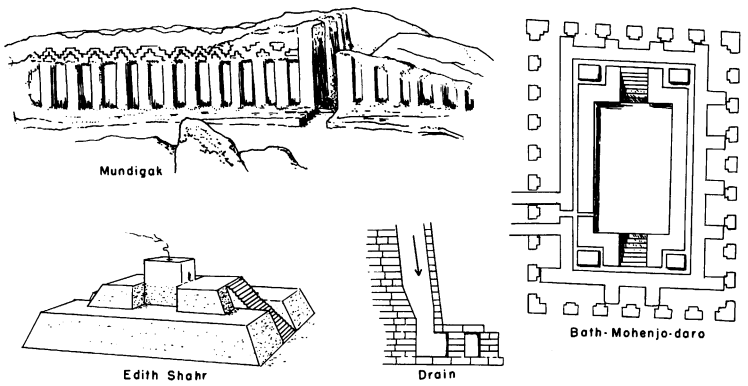


FIG 7. Characteristic buildings of Stage IV.

cultivable area. In Kolwa, southern Kalat, Zhob, Loralai, southwestern Sind, and Quetta, monumental structures occurred in the midst of the villages, either on a promontory within the village or immediately beyond its boundaries.

In the Indus River Valley the massive urban developments at Mohenjo-daro, Judeirjo-daro, Chanhu-daro, and, later, at Harappa manifestly belong in the same developmental line as that found in eastern Baluchistan and southern Afghanistan. Characteristically, the highest part of a typical mature Harappan site, even including village sites, is marked by monumental structures which possess drains and wells (?) as integral parts. These structures are often surrounded by walls. At Mohenjo-daro a colonnaded bath, rooms with drains in their floors, and a probable storage area or granary were within these walls.

Most impressive is the extent of the main Harappan sites as exemplified by Mohenjo-daro. The habitation areas east of the "citadel" cover 1,500,000 square feet, and the population could have numbered

about 40,000. Comparable population estimates can be found in Adams (1962, pp. 6–7), Braidwood and Reed (1957, pp. 19–31), and Frankfort (1948). The vast number of objects in many materials recovered in the excavations demonstrate the full-time activities of such professions as the metal smith, potter, weaver, seal carver, brick maker, figurine maker, and even possibly the toy manufacturer.

Direct contact with Mesopotamia may also have been a not uncommon occurrence in this period. Harappan seals have been found in late Akkadian context in Mesopotamia (Wheeler, 1953, p. 85; Gadd, 1932). The technique of inlay, certain bead forms, button seals, and some decorative elements such as the trefoil pattern and possibly the Gilgamesh (?) motif bear witness to Mesopotamian contacts. The Harappan wheeled cart, and some of the more utilitarian traits such as weights and measures, may have their roots in the stimulus of Mesopotamia. The enigmatic Harappan script found on the square seals of the time may owe at least part of its motivation to Mesopotamia, though the potters' marks of the earlier stages had a distinct role in the development of the script (Fairservis, 1956, pp. 328–329).

The Harappan civilization can be said to have achieved its characteristic style indigenously; its elaboration may be the result of Mesopotamian contact. However, it cannot be said that its origin is in any way divorced from the obvious line of development in Baluchistan and Afghanistan. On the present evidence it seems reasonable to assume that the Harappan civilization stemmed from the developing village complex characteristic of much of Iran in the third millennium before Christ. Apparently economic advantages inherent in the Indus Valley situation motivated the production of surpluses, the proliferation of populations, the amplification and the multiplication of non-farming specialists, and, in turn, the improvement or elaboration of traits already possessed or received by that population. (However, the pitfalls encountered in too close adherence to economic determinism were discussed by Adams, 1960.)

On the present evidence we can assign dates of from 2300 B.C. to 1700 B.C. for the stage in the Indo-Iranian Borderlands. It is best represented in southern Afghanistan (Mundigak IV), and in Baluchistan at Quetta (Damb Sadaat III), Loralai (Dabar Kot, Rana Ghundai III–IV), and Zhob (Periano-Ghundai-Zhob Cult), and all the so-called Kulli-Harappan levels in sites of southern Baluchistan (Nindowari, Kulli, Mehi, Edith Shahr). Harappan sites of this period are found in some number in southwestern Sind (Kohtras Buthi, Karchat, three sites in Malir, and other areas), and three are known along the Arabian seacoast (Bala Kot, Sotka Koh, and Sutkagen-dor). Mohenjo-daro, Chanhu-

daro, the Gandava sites, Judeirjo-daro, Kot-Diji, and Lohumjo-daro are other well-known sites in Sind and Kachhi. At Dabar Kot in Loralai District a Harappan level can be seen high on the mound. Mature Harappan sites are far-flung, in India reaching into the eastern Punjab, Gujarat, and Rajasthan. Their distribution was well attested by Rao (1964, pp. 5–27) and Wheeler (1959, p. 95).

### Stage V: Economic Decline and the General Abandonment of the Indo-Iranian Borderlands by Farmers of Developed Villages

Throughout Baluchistan only the largest village sites continued to be inhabited. The bulk of the villages were abandoned. Such occupation remains as have been found reflect a decline in the quality of craftsmanship and a degradation of building practices. In the Indus River Valley generally, only the largest sites continued to be occupied, and in an increasingly deteriorating situation. J. M. Casal (1964a) has suggested that Jhukar is a late Harappan manifestation which, in view of the character and distribution of the Jhukar assemblage, agrees with these evidences. However, flourishing late Harappan manifestations are found in the Punjab and in Gujarat, indicating that the populations of Sind and Baluchistan moved eastward, abandoning their old habitat. The universal aspect of this abandonment, uneven in accomplishment, suggests general economic decline, for if the optimum living conditions of the previous stage could have continued, some sites would bear evidence of this situation, and, if hypothetical or actual invaders had merely taken over a prosperous area, it would hardly have been generally abandoned.

In the latter part of the period, apparently, new people and cultures did arrive on the scene, some aggressively, but as a whole the evidence suggests that only a few of these people came into conflict with an established generation of older occupants. (The problem of the post-Harappan occupation of the Indo-Iranian Borderlands has been discussed by De Cardi, 1951, pp. 63–75; see also Fairservis, 1961b.)

The period can be dated after 1700 B.C., and it probably lasted as late as 1200 B.C. or even 800 B.C. in some regions of the Borderlands.

## CHARACTERISTICS OF INDO-IRANIAN BORDERLAND DEVELOPMENT

Certain points brought out by the above outline must be emphasized:

1. Once started, there was a general continuity of occupation. The stages generally overlapped and regional advances were uneven.

In this regard several individuals have emphasized their objections to

the seriation technique that we used in our excavations in Quetta and Loralai (Piggott, 1962, p. 254; Dales, 1966, pp. 260 ff.). These objections stem from a misunderstanding of the reasons for our using the technique. Seriation, as a technique, cannot be defended within the scope of the present paper. Its validity as a tool in archeology has been discussed and confirmed. One can find examples of it in the publications of many archeologists, of whom Kroeber, Nelson, Ford, Willey, and Spaulding are good examples. Until methodologies are used in subcontinental archeology that recognize the dynamics of culture history rather than history *per se,* we will be playing at the philately, which R. E. M. Wheeler criticized years ago. If ceramics (among other things) are to be used as correlative evidence, we had better know what happens to those ceramics where we excavate, before we establish chronological schemes which use them to tie Baluch or Sindi prehistoric villages typologically to Susa, Samarkand, or Timbuctoo! This means that all the ceramic evidence must be considered. The evidence must not be confined to whole vessel, painted wares, and other *objets d'art* alone. Correspondingly, the overuse of floor levels, walls, gates, hearths, and other architectural features as evidence of catastrophe, excellence, hierarchy, political event, or, indeed, the bounds of chronology, or cultural style, is now retarding subcontinental archeology as much as did sea-level stratigraphy in pre-Wheeler days. The evidence for human habitation in these prehistoric periods demonstrates both continuity and change. Cultural continuity and cultural change are not normally the accidents of environment but represent the process of man's societal and subsistence-seeking activities. Until archeologists are willing to study and to attempt to understand the complexities of the cultural phenomena that anthropology reviews, we will continue to have "seven-league-boot" schemes as remote from the actual situation as Velikovsky is from Darwin. Cultural change is not simply a matter of fallen walls and the appearance of polychrome pottery; it is a qualitative matter affecting the whole society. On this basis it behooves us to make our methodologies as sensitive as possible by some conscientious effort to utilize all the instrumentation available to us. Seriation is one method that has been tried and proved to be of use. It needs to be more thoroughly understood and put to more widespread use in subcontinental archeology. It is only one tool among many, but it is a good tool. Merely finding material in stratigraphic context and describing it are not enough. We need especially to assess our methodologies when at least 90 per cent of all habitation sites are villages and camp grounds. Techniques for excavating cities may not always be viable under these circumstances.

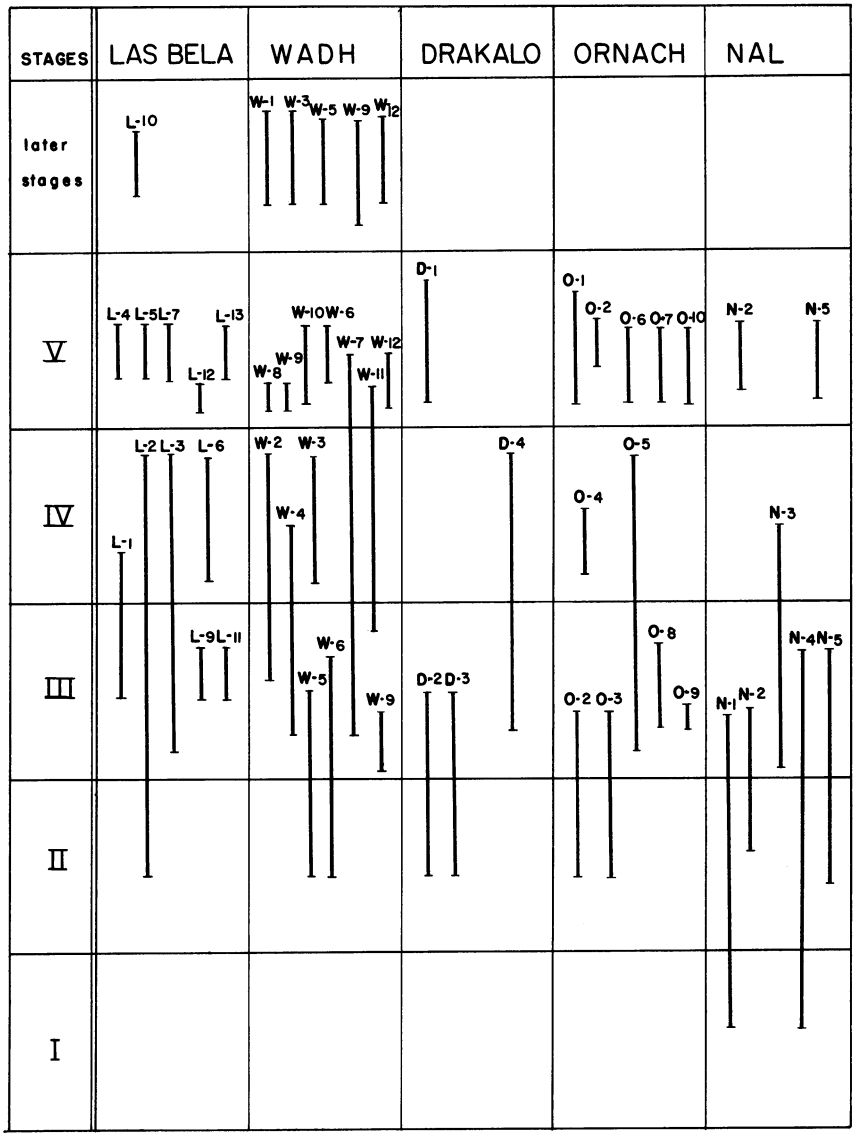


FIG. 8. Regional representation of late prehistoric sites of southern Baluchistan arranged according to stages represented generally by surface collections. Later stages are incomplete. Regions are arranged from south (left) to north (right). Note the apparent abandonment of these regions between Stages IV and V.

Our archeological strategies should be accompanied by a little wisdom and much care.

Concomitantly, our grounds for postulating vast chronological schemes that tie the Borderlands to western Asia typologically are much too weak to bear all the emphases researchers place on them. We are hardly able to trace the ties between Sind and Baluchistan on our present evidence.

2. The cultural conformity in Stages I and II was widespread. Conformity changed to regionalization in the later phases of Stage II and in Stage III. In Stage IV, while regionalization persisted in some regions, particularly in northern Baluchistan and Afghanistan, Sind, Punjab, Gujarat, northern Rajasthan, and southern Baluchistan were all settings for the same cultural style—the Harappan.

3. The links to Iran, especially to the north, were very strong from Stages I to III. However, the Indo-Iranian Borderlands were remote, and trait diffusion was slow in Stages I and II. By Stage III, however, diffusion was accelerated. In Stage IV we have evidence for direct contact with the west over land or by water. However, in both Baluchistan and in Sind (figs. 1, 8), the line of development was from north to south. This emphasizes the probable role of northern Iran and Turkmenistan as the sources of some of the principal cultural forms of the Indo-Iranian Borderlands.

4. Critical to an understanding of the processes that created the Harappan civilization is recognition of the fact that it is subcontinental in character. Neither the developmental motivation provided by Iran nor the probable technological advantages gained through contact with Mesopotamia changed its essential style.

The evidence indicates that the urban situation in the Indus River Valley was a logical development from advanced village farming in an optimum situation. In a complex of traits for which we have good evidence, India is prominent: multifaced deities, the "yoga" position, sacred cobras, phallic worship, cattle cults, ritual bathing, numerous bangles as female ornaments, cattle painting, motifs based on local fauna and flora, and horned headdresses all can be said to be subcontinental traits of the Harappan civilization. (However, some of these so-called "Indian" traits have been disputed by Sullivan, 1964, pp. 115–125.) It does not require much stretch of the imagination to recognize the roots of village India here. What is absent, of course, is the tangible body of societal and familial evidences that we need to recreate the specific nature of that village-urban society.

5. The final eclipse of the Harappan cultural style may have occurred when the knowledge of rice cultivation opened more southerly and east-

erly regions to the cereal farmers. One form of rice has been identified at the Harappan site of Lothal in Gujarat. Although it appears to have been undomesticated, its presence suggests that a stage of incipient rice cultivation was under way by at least the middle of the second millennium before Christ.

6. The chronological scale suggests that in less than 1500 years the former settlers of the Borderlands attained urbanization—a rapid rate of development that indicates the effect of contact with Iran and the west and the vigor of indigenous development.

## CHARACTER OF THE HARAPPAN CIVILIZATION

As now known, Harappan civilization possesses a characteristic style or form. Wherever it appears it presents a particularly striking unity; certain traits are virtually identical at sites distributed from the Arabian seacoast to the foothills of the Himalayas. These traits include location close to the active flood plain of a river, brick buildings on platforms with drains, toy carts, terra-cotta "cakes," clay bangles, bone or ivory inlay, female and animal figurines, seals and seal writing (identical in motif and sign), copper tools and weapons, weights, clay balls or pellets, the pottery corpus, graters, bathtubs, and an emphasis on representation of cattle on seals and figurines. At widely dispersed locations such as Lothal (Gujarat), Kalibangan (Bikaner), Dabar Kot (northern Baluchistan), Sutkagen-dor (Makran), Harappa (Punjab), and Mohenjo-daro (Sind) monumental structures are situated on the highest parts of the sites. This practice is widely duplicated in Baluchistan to the west in related sites. The over-all impression is that of a stable conservative civilization reminiscent of Old Kingdom Egypt, but certainly differing from the impression one has of ancient Sumeria. Some authorities have assumed that this conservatism was largely the result of a political administration, probably theocratic, whose rule is best exemplified by the fact that monumental structures were situated within the walls of a "citadel," i.e., the elevated portion characteristically found on the sites. Thus, the two largest sites, Harappa and Mohenjo-daro, were twin administrative capitals. Some emphasis has been placed on the identification of these structures as temple storehouses, granaries, barracks, and the like, which underlines the autocratic nature of administrative control (Piggott, 1950). The over-all description is apparently based on a socio-economic determinist pattern, of which the late V. Gordon Childe was a leading exponent. It is clearly modeled on Mesopotamian parallels.

However, if we examine these parallels, the differences are readily apparent. Sumerian civilization is characterized by a multiplicity of

cities, an increasingly efficient writing system, a peculiar man-god relationship, a progressive technology, a changing art style, a variety of international contacts, speculative thought, organized warfare, an extensive and effective irrigation system of characteristic form, and a concentration within a limited geographical area ecologically undifferentiated. These traits and trait complexes are largely absent from the Harappan civilization, according to the evidence we now have at hand.

The chronological priority of Sumerian civilization among world civilizations and the general role now accredited to Mesopotamian civilization in motivating the pre-dynastic florescence that preceded Egyptian civilization have naturally directed scholars to assume that Indian civilization stemmed from direct contact with Sumer or that pre-civilized Indians were motivated by stimulus from Mesopotamia. As Sir Mortimer Wheeler, the leading interpreter of the Harappan civilization, wrote, "the idea of civilization was in the air" (Wheeler, 1959, p. 104). This Mesopotamian ethnocentricism has been reinforced by the discovery of Harappan seals in Mesopotamia confirmed in Akkadian context or even earlier. Cylinder seals have also been found in Harappan context (Gadd, 1932; Mackay, 1937–1938, vol. 1, p. 344, vol. 2, pl. 89, no. 376 and D, pl. 96, no. 488). The Sumerian reference to the populous land of Dilmun to the east has motivated the eminent Sumerologist, S. N. Kramer, justifiably to postulate the possibility that the allusion was to the Indus River Valley (Kramer, 1963, pp. 281–284; 1964, pp. 44–52). However, he also saw the possibility that people of the Ubaid period, driven from Mesopotamia by the Sumerians, came to the Indus Valley where they initiated the development of civilization. As pointed out above, the Harappan style was already flourishing by Stage III. The Harappan civilization of Stage IV is a direct development from that stage. Nothing in the evidence suggests that the "urbanization" within the Indo-Iranian Borderlands of Stage IV was the result of exterior influences. The special florescence of culture at Mohenjo-daro and other "urban" sites apparently had its source in a built-in advantage based on the technology and interacting population of an already developed farming culture and rendered effective by the advantages of the Indus River ecology. There is little doubt that had soil, water, and a more concentrated population been possible, urban situations could have developed contemporaneously in southern Afghanistan and in parts of Baluchistan.

As a theoretical scheme, it is suggested that the contact between the highlands and the Indus plain had a significant role in developing the Harappan civilization. Given the concentration of settlement made

possible within the confines of the fertile but limited expanses of the neighboring upland valleys of the Indo-Iranian Borderlands, human interaction accelerated and ideas moved across regional boundaries. Initially, this interaction was maintained when the Indus River Valley was settled. As time passed in the almost unrestricted expanse of the Sind-Punjab-western India area, concentration of population was reduced, interaction between differing societies slowed, and, unstimulated to major change, men settled into stable repetitive lives. Thus, the characteristic style of the Harappan civilization was created.

But, in point of fact, we are investigating a civilization, the written records of which are still untranslated and of which the archeology is largely limited to excavation at the larger more urban sites. These facts have undeniably tended to color interpretations of the Harappan civilization, as if, for example, one visited London or New York and used these cities to represent either the whole of Great Britain or the United States. More than 150 sites of the Harappan civilization are known; of these, only three or four can qualify as "urban."

In view of the speculative quality of the interpretations of the Harappan civilization, the recent appearance of new and important evidence bearing on them is significant.

The first body of new evidence arises from the increase of excavated remains of pre-Harappan times. Prior to 1955 the limited excavations of Majumdar carried out in the early 1930's, and Sir Mortimer Wheeler's discovery of a non-Harappan level at Harappa, were the only sources for evidence of pre-Harappan occupation of the Indus Valley. In 1955 F. A. Khan at Kot Diji in Upper Sind revealed an extensive pre-Harappan settlement which contained abundant evidence bearing on the indigenous developmental character of the Harappan civilization. Somewhat later, J. M. Casal explored the site of Amri in southwestern Sind which had been previously only superficially excavated by Majumdar. Here the evidence points to rather close typological connections of pre-Harappan Amri with pre-Harappan Kot Diji and with comparable village assemblages of southern Baluchistan. At Amri the developmental line is less clear. One gains the impression that in its mature form the Harappan civilization was superimposed from without. This impression is reinforced by a similar phenomenon occurring in small village sites found by Majumdar in the vicinity of Lake Manchhar some 40 miles to the north of Amri. The Archaeological Survey of India, particularly on the basis of the survey by A. Ghosh (1965) and the excavations of B. B. Lal and B. K. Thapar, recorded an extensive pre-Harappan settlement along the banks of the now

extinct Ghaggar River branch of the Indus system in Bikaner in northern Rajasthan. There excavations at Kalibangan suggest the existence of ties to pre-Harappan Kot Diji. As at Amri, the major Harappan occupation is of the so-called mature type. The unexcavated site of Bhut in Bhawalpur marks the existence of pre-mature Harappan settlement between Bikaner and the type site. Beatrice de Cardi (1964, pp. 20–29) has found an extensive site at Gandava at the entrance to the Mula Pass into Baluchistan, and Raikes has discovered the not-too-distant site of Judeirjo-daro near Jacobadad on the flat alluvial plain of Kachhi (Casal, 1964a, pp. 11–12; 1964b). The Gandava sites and Judeirjo-daro bear surface evidence attributable to material of Kot Dijian type and for a range of artifacts that we can now classify as Early Harappan—in other words, precisely that developmental stage which has been missing from the record. The stage is now recognized only categorically in terms of changes in pottery form and decoration, figurine type, the presence of certain characteristic Harappan objects such as toy carts (in prototypical form) and terra-cotta "cakes," and the mutual dependence upon the same resources in soil and water. For Baluchistan the evidence indicates that the south, i.e., southern Kalat, Las Bela, and Makran were the last areas settled, whereas the north, i.e., northern Kalat, Quetta-Pishin, Kachhi, Zhob, and Loralai, provides the earliest evidence of settlement within Pakistan Baluchistan. (These researches will be published in a later study.) This north-to-south trend appears in the Indus Valley, especially in Sind, where, on the basis of the present evidence, the Early Harappan and Kot Dijian settlements occurred in the north, whereas the mature Harappan settlements are found as far south as the Arabian seacoast and the Kohistan portion of southwestern Sind and the Malir River drainage (fig. 1).

The cultural ties of the Indus Valley to the Baluchistan sequence are especially important, because there is evidence in Baluchistan for an early development of elaborate irrigation systems of the *kach* or bund type (Dales, 1962; Fairservis, 1961b; Raikes and Dyson, 1961; Stein, 1931) for the development of monumental structures using drains, and for a system of mutually intelligible symbols that can be regarded as one source, at least of the form, of the Harappan script (Fairservis, 1956, pp. 328–329). There is good evidence for the occurrence of an Amri storage dam and for the contemporary use of stone-reflecting or terrace dams in southern Baluchistan. Dams were used at a number of Harappan sites; those at Kohtras Buthi and perhaps the Malir River are especially notable. These features of pre-Harappan Baluchistan have not as yet been reported in the Indus Valley, but the gross size of sites

such as Judeirjo-daro and those of Gandava as well as what is known of the earliest stages at Mohenjo-daro all goes beyond suggesting that regional developmental advances in the Indo-Iranian Borderlands were mutually influential. In fact, it is very clear that in Baluchistan at least a process we have termed "Indianization" was under way. This process reached its climax in the development of large "ceremonial" structures that contained evidence of human and animal sacrifice (especially cattle), the ritual (?) use of water, and for the adoption of Harappan or Harappan-like objects for daily use (Fairservis, 1959, 1961b).

These trends in the interpretation of the new evidence for the locale of the Early Harappan development and the dawn of civilization in the Indian subcontinent are obviously of great importance, but the present lack of full-fledged and purposeful excavation at the key sites makes it impossible to trace the details of these trends. What is important, however, is that on the present evidence we believe that the style or form of the Indus Valley civilization had its earliest manifestations in a region remote from the coast where contact with Sumerian civilization is assumed to have occurred. This is not to say that such contact may not have occurred overland, as it probably did later, but that it is unlikely that contact diffusion with Mesopotamia germinated the Harappan civilization. It does suggest that the Indus Valley civilization was an indigenous development that arose out of the evolution of developed village cultures in a favorable environment. It emphasizes the subcontinental roots and the consequent "style" which gives the civilization its uniqueness.

A second body of more recent evidence apparently amplifies the above suggestions and helps to define the peculiar qualities of the mature Harappan civilization. The Indus River system and its relationships to human activity have been rather poorly known in spite of numerous studies that ranged over a century. A recent publication by Revelle (1964) is paramount among a number of significant studies bearing upon the man-river relationship in its modern terms (Government of Pakistan, 1960; 1961). The fact that traditional methods of farming are the rule rather than the exception in much of modern Sind renders the Revelle report and similar ones of more than a little importance to the study of the Harappan civilization, particularly in view of the almost exact parallels that can be found between some artifacts of the Harappan civilization and those of rural twentieth century Sind. An approach to an understanding of aspects of the Harappan civilization might be made by using these modern data.

Mohenjo-daro, the largest of the Harappan sites, is close to the right

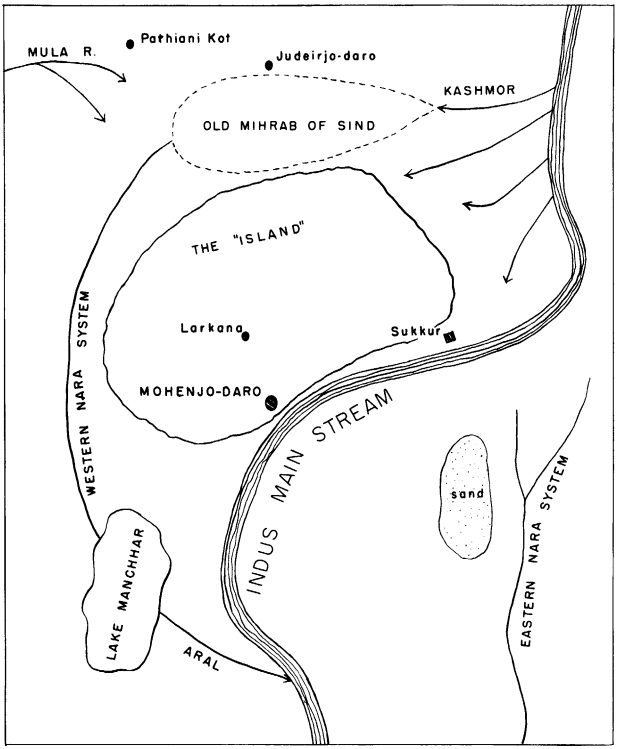


FIG. 9. Sketch map of the hydrographic system of the lower Indus Basin from Kashmor to the Aral outlet of Lake Manchhar.

bank of the modern Indus River in Larkana District of northern Sind. At the present time the surrounding area would be inundated annually were it not for a series of protective bunds, most of which are of recent origin. In modern times cultivation in the area has been wheat, millet (*jowar*), and rice—the last a rather recent introduction. The Larkana Canal, which has its source in the Lloyd Barrage at Sukkur, is the major source of water for cultivation in the area. However, the surplus canal water of the Larkana District is apparently allowed to percolate to the fields in areas of poor drainage, causing waterlogging (Revelle, 1964, pp. 61–62). This rise in the water table has been rather dramatic since the completion of the Lloyd Barrage. The climate of northern Sind is semi-arid (annual rainfall, less than 10 inches). Since the mean annual temperature is around 90° F., the evaporation of surface water is very rapid. The salt content of the water table is high, and, through

leaching, large areas have become unfit for cultivation. Recently the Government of Pakistan has forbidden the cultivation of rice in the area, and there are plans to lower the water table by means of tube wells.

The Indus River at the Lloyd Barrage at Sukkur has, according to Revelle (1964), twice the annual flow of the Nile and 10 times that of the Colorado River. The immense amount of silt it carries constantly raises its bed and creates levees as it meanders over the flat alluvial plain of Sind. From Sukkur, south to the delta, the fall is only about 9 inches per mile. Above Sukkur, at Kashmor, the river is some 60–80 feet higher than the town of Jacobabad 70 miles to the west (fig. 9). As late as Moghul times, the annual summer floods often caused breaks in the western levees above Sukkur (Heddle, 1855, pp. 414–415; Raverty, 1893). The flood waters would flow to the west, passing between Jacobabad in the north and Ratodero and Larkana on the south, and may have been the water resource for Judeirjo-daro. Eventually, these waters found an outlet in the so-called Western Nara System which runs parallel to the Indus River less than 40 miles to the west along the edge of the Khirtar Range of eastern Baluchistan whence some torrential water augmented the Nara flow. On the south, in the vicinity of the old Islamic city of Sehwan, the Nara waters pass into Lake Manchhar, a shallow, seasonally fluctuating body of water rarely deeper than 4 feet at the center of its basin. Passage from the lake to the south is blocked by the Laki Hills which extend eastward from the Khirtar. Thus the flood waters of Lake Manchhar find an outlet via the Aral Channel back to the main stream of the Indus. Though there is evidence that the general drift of the Indus River has been to the west since the late Pleistocene (Pithawalla, 1959, pp. 80–81; Wadia, 1957, pp. 392–393), it appears unlikely that the main features of the southern Indus Valley drainage have changed over the past 5000 years. The rock outcrops of Rohri near Sukkur tend to channel the main Indus drainage much as the cataracts affect the Nile River. To the east, the Thar Desert and the high ground around Khaipur have also played a role in determining the present position of the main Indus stream in northern Sind. However, some authorities have postulated the existence of a more easterly main stream marked by the bed of the now extinct Hakra Channel and the so-called Eastern Nara System (Pithawalla, 1959, pp. 45–46; Lambrick, 1964, pp. 33 ff.). The Sarasvati-Ghaggar drainage, now extinct, would have augmented the eastern Indus Valley river system, however, and that, plus the possibility that flood waters moved eastward from Sukkur or more northerly regions, can account for the traces

TABLE 1
FOOD CONTENT (PER 100 GRAMS) OF PRODUCTS IDENTIFIED FOR THE HARAPPAN CIVILIZATION

| Foodstuffs | Calorie Content | Protein Content in Per Cent |
|---|---|---|
| Cereals (wheat and barley) | 335 | 10.0 |
| Vegetables | | |
| Peas (*Pisum aesativum*) | 339 | 23.8 |
| Other | | |
| Fruits | | |
| Bananas | 88 | 1.2 |
| Figs | 79 | 1.4 |
| Mangos | 66 | 0.7 |
| Pomegranates | 63 | 0.5 |
| Melons | 32 | 0.5 |
| Dates | | |
| Oils and fat | | |
| Sesamun | 568 | 19.3 |
| Ghee | 804 | 0.0 |
| Sugar | | |
| Honey (?) | 300 | 1.3 |
| Other (?) | | |
| Meat and fish | | |
| Beef | 240 | 18.0 |
| Mutton or goat | 260 | 16.5 |
| Fish | 100 | 16.4 |
| Milk and curds | 80 | 4.2 |
| Nuts (?) | | |

of river systems in the east. In any case, the present evidence for a sizable flow of river water in the Larkana-Lake Manchhar areas in the third millennium before Christ is substantial.

The distribution of Harappan sites in northern and western Sind emphasizes the accuracy of the concept that the ancient Indus system is generally comparable to the modern system (fig. 1). The site of Judeirjo-daro, north of Jacobabad at the edge of the desolate plain of Kachhi, lies at the limit of the present-day, canal-irrigated cultivation. Lohumjo-daro is about 30 miles south of Mohenjo-daro. Jhukar is west of the modern city of Larkana, and Mohenjo-daro is 16 miles south of that city. Kot Diji and Naru Waro-dharo are at the edge of the Khairpur outcrops and gravel plain overlooking the left bank of the Indus. Two Harappan village sites are at the edge of the flood plain at Lake Manchhar. Amri, to the south, overlooks the Indus Valley from a position close to and even on the Kohistan gravel plain which forms the west

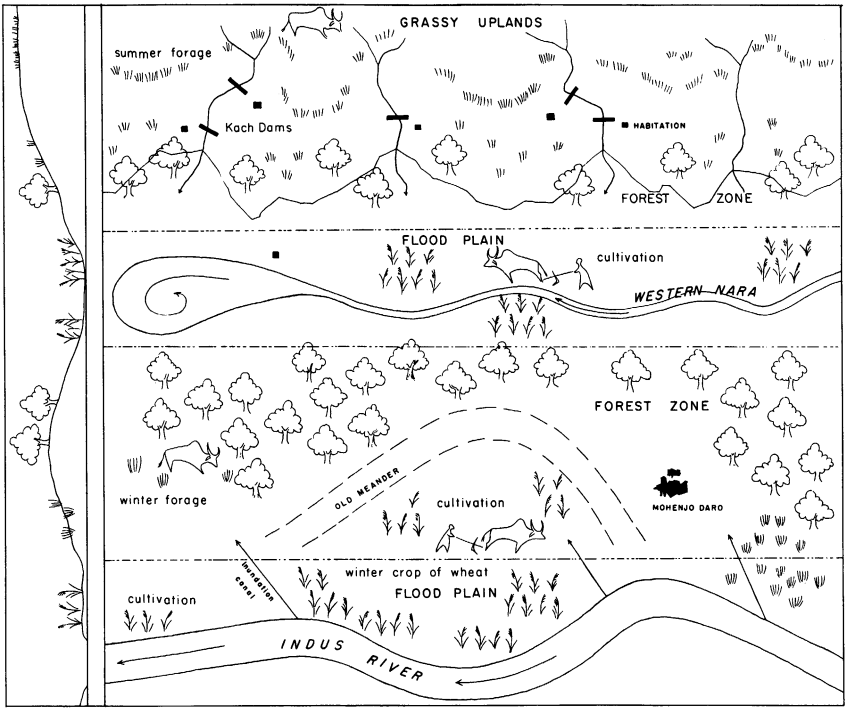


FIG. 10. Idealized cross section of the Indus River Valley along an east-west axis in the vicinity of Mohenjo-daro. The captions relate to the ancient situation. Elevations, somewhat exaggerated, are on the left of the drawing.

rim of the valley in that region. For the rest, the Harappan sites of western Sind are geographically in Baluchistan; they are situated along the river and stream systems of the eastern rim of that mountainous region. In other words, the bulk of the known Harappan sites in western and northern Sind are not part of the Indus Valley region at all. However, the Indus alluvium doubtless now conceals the smaller settlements, leaving only the larger (and higher) remains standing above the alluvium.

The existing remains in the Indus Valley itself demonstrate none of the characteristic settlement patterns had there been dependence on canal irrigation (other than short inundation canals). Rather, the individual locations strongly suggest that their *raison d'être* was access to the Indus flood plain for purposes of cultivation. The list of cultivated plants gathered by archeologists from remains found at Mohenjo-daro (table 1)

also bears witness to the practice of flood-plain agriculture, and strongly suggests that, on the present evidence, the farmers of Mohenjo-daro grew only a winter or *rabi* crop.

Four essential physical features are apparent in the Indus Valley alluvial area: the active flood plains, the meander flood plains, cover flood plains, and bars (fig. 10). Of these features the bars and the cover flood plains, the best for cultivation, amount to 12 million acres in Sind. These plains are now, of course, irrigated by canals. In Sind there are approximately 1.2 million acres of the active flood plains, some of which are cultivated today. The evidence for the Harappan civilization in Upper Sind suggests that neither the bars nor the cover flood plains were extensively cultivated.

Mohenjo-daro itself was not, of course, on the active flood plain, though it might be so today were it not for protective bunds. However, we can assume that it was situated close to the flood plain which was the center of farming activity—probably on the meander flood plain just as is the adjacent modern village of Hasan Wuhan.

The cover flood plain and to some extent the meander flood plain are outside and higher than the active flood zone, except in the circumstances of very high flooding. These areas are therefore the seat of forests which in Sind are essentially xerophytic and include acacia, capparis, zisyphus, and tamarix. However, the more watered areas have a more varied flora and include *Populus euphratica* (bahan), *Acacia arabica* (babul), *Prosopis spicigera* (kandi), *Dalbergia sissoo* (tali), and *Ficus. Acacia, Dalbergia, Prosopis,* and *Tamarix* sp. (lai) are all excellent sources of fuel (Ishaq, no date). The grassland, especially along the slopes of the valley rim and on the Baluch plateau and persisting in the higher areas within the alluvium, is of the *Dicanthium-Cenchrus-Elionurus* type. The *Elionurus* is especially good for grazing.

Undisturbed by man, these forest and grassland areas above the active flood zone were in all probability dense and flourishing. In case of biotic interference by man, the grasslands would succeed the forest areas, but these would in turn be reduced if used for cultivation or overgrazed (Puri, 1960, pp. 30, 271 ff.). Unless we assume climatic change in which increased rainfall would have permitted the growth of tropical savanna forests (the type most likely to have grown on the alluvial soil with less than 50 inches of rainfall), for which we have no trace, we must assume that the xerophytic forest species named above were dominant in Harappan times. However, riparian forests must always have existed in the Indus delta and in spots along water-filled meanders or near the Indus banks. (The best argument against the

theory of significant climatic change in the region has been advanced by Raikes and Dyson, 1961, pp. 265–281.) The importance of the latter to Harappan man, however, is not known.

The presence of acacias and euphorbia in the desert areas surrounding the lower Indus Valley proper seems to indicate biotic interference by man, in that these plants flourish when other vegetation has disappeared owing to overgrazing. This process still goes on in Sind, Rajasthan, and Baluchistan. It is impossible to ascertain whether it began in Harappan times, though there seems little doubt that it did in view of the archeological evidence that sheep, goat, and cattle were raised.

A tradition in Sind is to call the Larkana area the "Island." The area is indeed higher than the surrounding region and rises above the Indus flood generally (fig. 9). The drain-off to the western Nara above Rato-dero in former times seemingly confirms the fact that the land between the western Nara and the Indus River flood plain was slightly elevated from above Larkana south to the Aral Channel breakthrough and the Laki Hills. This elevated region consisted of the bars, cover flood plains, and part of the meander flood plains. It was presumably the most densely forested region and, according to the present evidence, it was also the locale for human settlement.

Within the forested area and the adjacent grasslands, the ecologies supported the elephant, the Indian rhinoceros, the zebu, the buffalo, the tiger, and other animals. The hog deer, the swamp deer, and probably the lion are also noted among the big game. Reptiles included the cobra, the crocodile, species of water snakes, the python, and a softshell turtle (*Chitra indica?*). Most of these animals either exist in Sind today or were known there within the time of written records (Aitken, 1907, pp. 48–61; Pocock, 1939–1941; Boulenger, 1890; Minton, 1962).

Our present evidence strongly suggests an environmental setting in Harappan times similar to that of today, but in the modern situation it has been greatly changed by man's biotic interference.

The term "Mature" has been used to label that stage of development of the Harappan civilization best represented at Mohenjo-daro by the so-called "citadel" complex of buildings, which includes the Great Bath, the Granary, and other monumental structures situated high on a mound on a series of platforms. The extensive occupation marked by the best-constructed houses, drains, and streets in areas DK, VS, and HR also belong to this period. The bulk of the famous seals, the most distinctive stone and metal sculpture, and the characteristic black-on-red pottery are artifactual representatives of the period. As pointed out above, a Mature Harappan phase is found in sites as far west as Sut-

kagen-dor on the Makran coast, as far east as Lothal in Gujarat, as far north as Harappa on the Ravi, and Rupar at the foot of the Himalayas in the northern United Provinces of India. Apparently it was a short-lived period among the Harappan village sites in Sind, especially those around Lake Manchhar and southward to the drainage of the Malir River region. The evidence suggests that during the Mature Harappan period there was widespread movement out of Sind to the north, south, and east. That this movement was quite rapid seems to be confirmed by the almost exact identification of a large variety of artifacts ranging from Makran to the Himalayas. Again, it should be emphasized that generally in those areas where there was an already established pre-Harappan settlement, the Mature Harappan stage was superimposed rather abruptly. This situation has been noted at sites as widely separated as Amri in the south and Harappa on the north.

## THE DECLINE

What is the reason for this rapid diffusion at the climax period of the civilization? The answer is not readily apparent, but there is a strong suggestion of a growing population confronted by failing resources. As Wheeler has pointed out, "they were wearing out their landscape" (Wheeler, 1959, p. 113). But what is meant by this expression? What was the man-water-land relationship which lay at the foundation of the Harappan civilization and in the end caused its decline? A glimmer of light has been cast on the problem by Revelle (1964) and by other reports.

A reasonable estimate of the population of a habitation site can be obtained by comparing excavated house plans with modern village houses in the same situation. According to the West Pakistan census, there is an average of five to six individuals per household within the average village of Sind and Baluchistan (see also Braidwood and Reed, 1957).

Where we have been able to compare house plans at excavated sites such as Kechi Beg, Damb Sadaat, Nal (Surkh damb), Chanhu-daro, and Kot Diji, we can ascertain the approximate number of houses probably present at a given period in the total visible site by reference to the fraction of the excavated portion to the total visible mound (table 2). Thus if we assume that six individuals occupied a house, we are able to estimate the total population of the site. Obviously there are pitfalls in this method. We do not know, for example, what proportion of a village site was given over to non-inhabited dwellings such as temples and storehouses, nor is the total area of the site always

TABLE 2

POPULATION ESTIMATES FOR SELECTED SITES IN THE INDO-IRANIAN BORDERLANDS, BASED ON STATISTICS OF MODERN SETTLEMENT IN WEST PAKISTAN

| Site | Period | Approximate Size in Feet | Square Feet | Total Number of Houses | Estimated Population |
|---|---|---|---|---|---|
| Kechi-Beg (Q14) | H-2, DS-I | 210×120 | 25,200 | 35 [a] | 210 [a] |
| Damb Sadaat (Q8) | DS-I-III | 400×400 | 160,000 | 181 | 1,086 |
| Mohenjo-daro [b] | Harappan | 3000×2750 | 5,500,000 | 10,428 | 41,250 |
| Ghazi-shah | Amri-Harappan | 525×450 | 236,250 | 295 | 1,770 |
| Amri | Amri-Harappan | 1800×450 | 810,000 | 1,012.5 | 6,075 |
| Kot Diji | Amri (Kot Dijian) Harappan | 600×400 | 240,000 | 300 | 1,800 |
| Lohumjo-daro | Harappan-Jhukar | 900×600 | 540,000 | 675 | 4,050 |
| Pir Lal Chatto | Trihni | 475×420 | 199,500 | 249 | 1,494 |
| Pandi Wahi | Amri | 450×350 | 147,500 | 184 | 1,104 |
| Chauro | Amri | 500×300 | 150,000 | 187.5 | 1,125 |
| Chanhu-daro (Majumdar, 1934) | Harappan | 1000×700 | 700,000 | 875 | 4,950 |
| Judeir-jo-daro | Harappan | 1800×1500 | 2,700,000 | 3,375 | 20,240 |
| Harappa, Mound E | Harappan | 1200×1800 | 2,160,000 | 2,700 | 16,200 |
| Harappa, granary mound | Harappan | 1020×960 | 979,200 | 1,224 | 7,344 |
| Harappa (Total, exclusive of "citadel") | Harappan | — | 3,139,200 | 3,924 | 23,544 |
| Harappa, "citadel" | Harappan | 1800×840 | 1,512,000 | | |
| Malir 2 | Harappan | 540×420 | 226,800 | 283.5 | 1,701 |
| Nal Bazar | Harappan | 375×405 | 151,875 | 190 | 1,140 |
| Amilano | Harappan | 330×345 | 113,850 | 142 | 852 |

[a] The unit estimates are 800 square feet per person, or six people per house, in rural areas. In Q14, 180 square feet equals ¼ house, and 720 square feet equals one house; in Q8, 882 square feet equals one house. The figure of 800 square feet is the "average." (See Government of Pakistan, 1962.)

[b] Exclusive of the "citadel" and the area between it and VS, DK, and HR. As only approximately one-third of the total site has been excavated, two-thirds have been added to include the whole site as it is known from surface remains.

TABLE 3
MODERN CENSUS FOR LARKANA DISTRICT, SIND

| | Approximations | Percentages |
|---|---|---|
| Total population | 605,000 | |
| Total labor force | 230,000 | 38% of total population |
| Cultivators | 179,000 | 78% of total labor force |
| Herders, fishermen, and others | 5,000 | 2% of total labor force |
| Non-agriculturists | 46,000 | 20% of total labor force |

Mohenjo-daro, non-agricultural occupations
- Administrative
  - Priests
  - Scribes and seal cutters
  - Musicians and dancers
  - Engineers
- Productive
  - Potters
  - Weavers
  - Brickmakers
  - Masons
  - Carpenters
  - Metallurgists
  - Traders

visible, since more frequently than not the level of the surrounding plain has risen. Nonetheless the purposes for which these population estimates are obtained require relative and not absolute data. The error is more apt to be on the conservative side, i.e., an underestimate.

According to this method of estimating population, a ratio of 800 square feet per person can be worked out. The total area of Mohenjo-daro, exclusive of the monumental structures of the "citadel," is probably approximately 5,500,000 square feet (table 2); thus, we can estimate the population as being 41,250 persons—probably a conservative figure, as pointed out above. If we use a figure for a typical rural area (Larkana District, Sind) from a modern census of Pakistan, we can make a population analysis of some significance (table 3). Most notable is the fact that less than half of the estimated population is a part of the productive work force. Based on a study of the nature of artifacts and the character of the site, a productive work force for that city can be worked out by reference to activities (table 3). One of the generally accepted criteria for defining civilization is the number of non-farming specialists supported by a surplus of foodstuffs obtained by the total

society. The amount of surplus dictates the number of non-farming specialists the civilization can support. Obviously, a falling-off of the means of subsistence, for whatever reason, reduces the surplus, and the consequent strain on the economy causes movement away to areas

TABLE 4
POSSIBLE INDIVIDUAL DAILY DIET IN ANCIENT TIMES

| Foodstuffs | Calories | Grams |
|---|---|---|
| Cereal | 1500–1600 (1617) [a] | 477.6 |
| Vegetables | 50 (31) | 14.8 |
| Fruit | 50 (32) | 76.9 |
| Oil, seeds, and fats | 100 (89) | 14.6 |
| Sugar [b] | 100 (137) | 33.3 |
| Meat and fish [b] | 200 (24) [c] | 160.0 |
| Dairy products | 125 (125) | 156.2 |
| Other [d] | 375 | ? |
| Total | 2500–2600 | 933.4 |

[a] Figures in parentheses record the diet of an average Pakistani today, which includes rice (Government of Pakistan, 1960).

[b] Fish and honey do not require cultivated acreage. We can assume that fish was probably not an important part of the daily diet in farming villages, though it was consumed often during the year. Thus, these estimates are primarily based on beef and mutton consumption. However, sugarcane and sugar beets, available today, are not indicated before 1000 B.C.

In both India and Pakistan the consumption of beef and mutton is minimal because of religious taboos, expense, and other factors. The eating of meat in ancient times is, however, confirmed by both traditional records and the bone remains in excavations.

[d] This category includes both domestic and wild vegetables, nuts, game, shellfish, and the like. So far their use has not been confirmed by archeological evidence, but some of these were, with some certainty, part of the diet. Eggs may also have been included in the daily diet. Chicken is in evidence at Kalibangan but not at Mohenjo-daro.

offering better subsistence possibilities. Significantly, it is the farming population that is the first major unit of the society to move away, because they possess the means to develop new lands and to support their own closely related, non-productive young and aged. The specialists in the characteristic rural "civilization" follow the farmers, rather than the reverse. Farming methods and related traits are usually stable elements within the culture and thus may account in part, at least, for the astonishing identity of Harappan sites remote from one another. Of the total wheat production in modern rural West Pakistan, 15 to 30 per cent is sold outside the villages; the rest is consumed locally. In a poor year, this percentage is drastically reduced. It is doubtful, on the

present evidence, that the wheat production of the flood plain in Harappan times was better than this figure. Thus if one uses the modern figure for Larkana District, 20 per cent of the non-farming population had available probably about one-fourth of the total crop, a fraction that a forced reduction of the total subsistence base through flooding or other disaster would drastically reduce. In the struggle for survival the farmer would be motivated to move elsewhere, followed finally by non-productive specialists. Thus we have apparently one factor that, this evidence suggests, helped to motivate the rapid move of the Harappans along and away from the Indus River Valley.

Food scientists have estimated that about 2300 calories is the minimum basic food requirement to sustain a working man, a quantity unfortunately not available to many on the subcontinent, even today. (Data on calorie needs as well as calorie content of foods drawn from Bowes and Church, 1963; United States Department of Agriculture, 1960; Revelle, 1964). To assess the role of dietary habits and food requirements and the demands on the Harappan economy, we have used 2500 calories per individual per day as a reasonable low estimate of the food energy available. Since we have considerable knowledge of the food resources at Mohenjo-daro, we are able to work out a probable diet commonly available in Harappan times (table 4). The significant figure is that for cereal grains, which provide more than three-quarters of the daily calorie intake. Again, the emphasis is on the ability of the farmer to produce, from one annual crop, sufficient cereal grain to fulfill this dietary requirement.

The advantage of setting up some reasonable picture of the daily requirement becomes clear when one attempts to ascertain the acreage necessary to support the estimated population. To provide an individual with 477.6 grams of cereal per day, it is necessary to produce 174,214 grams per year (365 multiplied by 477.6). According to Revelle and the writers of other reports, the wheat yield per acre is 8.7 maunds (Revelle, 1964, p. 90). There are 37,320 grams per maund, or 324,684 grams per acre (37,320 multiplied by 8.7 maunds). Thus one acre fed annually 1.86 individuals (324,684 divided by 174,214). This figure compares favorably with figures obtainable for West Pakistan today (Las Bela, 1.19; Larkana District, 2.27; submontane West Pakistan 1.0).

The wheat acreage estimated for Mohenjo-daro is 22,715 acres (41,250 divided by 1.86). This is of course exclusive of the acreage necessary for other crops, but, since their dietary contribution, though necessary, is not on the same scale as the wheat, on the present evidence their acreage requirement is omitted here. Suffice it to say, therefore, that

TABLE 5

ESTIMATED VITAL STATISTICS FOR MOHENJO-DARO, INDUS FLOOD PLAIN

| GENERAL | | | | | | |
|---|---|---|---|---|---|---|
| Acres, Sq. Ft. | No. of Houses | Acres Cultivated | Individuals Per Acre | Wheat Acreage | Fodder in Acres | Annual Fodder Requirements, Tons |
| 5,500,000 | 3164 | 25,812 | 1.86 | 22,715 | 3097.5 | 41,535 |

| CATTLE | | | |
|---|---|---|---|
| No. of Cattle | No. of Work Bullocks | No. of Milk Cows | No. of Cattle Young and Aged |
| 8754.8 | 3226.5 | 2610 | 2918.3 |

| FODDER, IN TONS | | | |
|---|---|---|---|
| Annual Fodder (Wheat/straw, 1/1) | Fodder Cultivation, 12% of Total Acreage | Cultivated Fodder | Grazing for Forage |
| 8130.1 | 619.5 | 8749.6 | 32,785.8 |

| POPULATION | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Total | Males | Females | Males, Ages 0–9 | Females, Ages 0–9 | Males, 60+ | Females, 60+ | Productive Population | | Total |
| | | | | | | | Males | Females | |
| 41,250 | 21,792 | 19,458 | 7527 | 7122 | 14.6 | 1070 | 12,849 | 11,266 | 24,115 |
| | 52.5% | 47.5% | 35% | 36.6% | 6.5% | 5.5% | | | |

| DAILY DIETARY REQUIREMENTS PER INDIVIDUAL, IN CALORIES (TOP) AND GRAMS (BOTTOM) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Diet | Cereal | Vegetables | Fruit | Oil and/or Seeds | Sugar | Fish and Meat | Dairy Products | Other |
| 2500 | 1600 | 50 | 50 | 100 | 100 | 200 | 125 | 375 |
| 933.4+ | 477.6 | 14.8 | 76.9 | 14.6 | 33.3 | 160 | 156.2 | — |

the above figure is an underestimate. Increased acreage requires more productive energy and more available land.

The relationship of cattle to man provides the best insight into the problems of the economy of Mohenjo-daro. Striking among the remains of the period are the depictions on seals and in clay figurines of two kinds of cattle: humped species (*Bos primigenius*) and a short-horned species (zebu) probably identical with that found in western Asia. The water buffalo is present. Cattle remains are found in both Harappan and pre-Harappan sites in Sind and occur in the earliest deposits of settled life now known in Baluchistan (Kili Ghul Mohammad I). At the site of Sur Jangal in Loralai District of Baluchistan there is a suggestion that cattle replaced goats and sheep in the economy (Fairservis, 1959, pp. 299–300). In South India, Allchin (1963) has found definite evidence of a widespread cattle-herding culture which may well date before 2000 B.C. The importance of cattle in Harappan times can hardly be underestimated on the present evidence.

Cattle fulfill two basic needs. One is as a source of food with, more than likely, some emphasis on dairy products. Their secondary use is as a source of energy, particularly for ploughing. An interesting aspect of the modern use of milk in West Pakistan is that 60 per cent of all milk goes to human consumption and 40 per cent to calves. These figures again emphasize the amount of production necessary to provide for both the sustenance of the food-producing resource and the excess to be used by man. In West Pakistan, of 9,000,000 cattle, 17 per cent are producers of milk, a third are calves or young without calves, and one-half are work animals. In Khairpur State a ratio of one bullock per eight cultivated acres has been worked out (Revelle, 1964, p. 204) as 0.13 bullock per acre. The ratio of cows to bullocks is 0.2.

Based on our estimates of cereal acreage needs and the daily dietary requirements, we are able to arrive at an estimate of the cattle population (table 5). However, we must first assume that, in addition to cereal acreage (22,715), some effort was made to grow fodder. Both *bajra* (sorghum) and *jowar* (millet) are important fodder crops of the *rabi* season; both these crops are attested to have been grown in ancient times elsewhere (Helbaek, 1960; Murdock, 1959, p. 68; Goodrich, 1943, p. 175). Whether one or both were grown in the Indus River Valley is unknown. Sorghum seems to appear much later in antiquity than does millet. Both of these cereal crops are reported considerably later than other cereals. Therefore, it is entirely possible that neither was grown in Harappan times. However, today, fodder acreage is 12 per cent of the total acreage cultivated or, at Mohenjo-daro, 3097.5 acres. Thus, the

total acreage cultivated can be estimated to have been 25,812. This is exclusive of the possibility that cotton was grown and was the basic cloth fiber used. So far no evidence for the cultivation of flax has been found, but bast fiber was used in Baluchistan (Bird, 1956). Possibly cotton or other fiber acreage is omitted because we have no data on which to base such an estimate for either modern or ancient acreage. In any case the addition of these data will increase the totals, which emphasizes the fact that the present estimates are probably underestimates.

Straw is the basis of dry fodder. The ratio of stalk to grain with *jowar* and *bajra* is 3.5/1, according to modern studies of cattle usage in Bihar, the nearest documented situation available (Fahimuddin, 1963, p. 66). (We should also note the absence of paddy in ancient times which today forms a substantial portion of modern fodder production.) Wheat straw, on the other hand, is calculated on a basis of 1/1. We can calculate the available wheat, since we have an estimate of the annual wheat production [22,715 = 197,620.5 maunds, or 16,260,215 pounds (rounded off) or 8130.1 tons]. Thus 8130.1 tons of wheat-straw dry fodder were possibly produced annually. *Jowar* production is 445 pounds per acre annually, and *bajra* is 345 pounds per acre annually. If we estimate 400 pounds of *rabi* dry fodder per acre as an average, we arrive at an annual yield of 619.5 tons of dry fodder (3097.5 acres by 400 pounds). The estimated total dry fodder yield is thus 8749.6 tons (8130.1 divided by 619.5).

According to our figures, the number of work bullocks necessary to cultivate 28,812.5 acres is 3226.5 (25,812.5 divided by 8), and the equivalent number of cows per bullock is 645.3. Thus 3871.8 cattle were necessary for the work energy required. The daily dairy-food requirement per individual was 156.2 grams, or 57,013 grams per year (we round off to 57,000 grams). The lactation period of a cow is 300 days. Based on an average of 9 pounds of milk per day per cow (4082.4 grams), we arrive at an approximate annual figure of 1,500,000 grams of milk per cow. If we use the figure of 60 per cent for human consumption (Revelle, 1964), we arrive at 900,000 grams per cow as the annual amount available (600,000 grams to calves). If each individual needs 57,000 grams of milk annually, each cow provides milk for 15.8 people each year. Thus, 2610.7 cows are needed for a population of 41,250 people (41,250 divided by 15.8). In accordance with modern estimates, we must add one-third more to this cattle population in order to include old animals, calves, and cows without calves. The total cattle population can now be estimated, as follows:

| | |
|---|---|
| Work animals | |
| Bullocks | 3226.5 |
| Cows/bullocks | 645.3 |
| Total | 3871.8 |
| Milk production | |
| Cows | 2610.7 |
| Less cows already in hand | 645.3 |
| Total | 1965.4 |
| Milkless cows, calves, and others (one-third of total above) | 2918.3 |
| Total cattle | 8755.5 |

The daily fodder requirement for cattle on the basis of modern requirements for low-weight cattle is 600–700 pounds (Revelle, 1964, table 5.16; Fahimuddin, 1963, pp. 68–77).

| | DAILY | ANNUALLY |
|---|---|---|
| Fodder Requirement (in pounds) | | |
| Dry | 10 | 3650 |
| Green | 15 | 5475 |
| Other (concentrate) | 1 | 365 |
| Total | 26 | 9490 |

Thus, the total annual fodder requirement is 41,535.4 tons (8755 multiplied by 9490 equals 83,070,950 pounds, or 41,535.4 tons. As described above, the total fodder yield, as we can now estimate it, was only 8749.6 tons, or 32,785.8 tons short of the basic requirement. If our figures in any way approach reality, the inhabitants of the mature period at Mohenjo-daro would have grown only about one-fourth of their fodder needs. It follows that the remaining three-quarters had to be obtained by foraging in the surrounding forests and grasslands. This formidable assault on the indigenous flora most certainly affected the ecology and had an adverse effect on the land and aided the spread of the active flood plain.

Like the cattle, man himself drew heavily on the local forests for fuel. Though it is difficult to estimate the ratio of fuel to quantity of brick, the enormous amount of fired brick that constitutes the visible site of Mohenjo-daro makes a marked impression on the visitor. Estimates of as many as 5,000,000 have been made for the number of fired bricks on the site. Personal observation of the use of *kandi* wood as a fuel for firing modern brick in Sind indicates that a mature tree provides enough fuel to fire about 1000 bricks in modern kilns. This rough ratio suggests a drain on the available forest resources, even if the estimated total of bricks at Mohenjo-daro were lowered by two-thirds. Raikes and Dyson (1961, p. 276) suggested that 400 acres of gallery forest would have been sufficient for a rebuilding of Mohenjo-daro at

intervals of about 140 years. This calculation of 100,000 bricks to 80 to 100 tamarisk trees agrees with my own observations. The use of manure as fuel would certainly lower the demands on the local forests, as Raikes and Dyson suggested (see also Dales, 1962, p. 33).

This application of modern data to an assessment of the ancient situation produces a graphic estimate of what must have been difficult ecologically and economically. The levelness of the plain of northern Sind, with its native vegetation denuded and the surface of the ground exposed by man, beast, and wind, increased the active flood zone and therefore endangered the cities and villages. Conversely, the growth of population, human and animal, dependent almost solely on a *rabi* crop, created seasonal stresses which in the end caused the abandonment of most of the region.

At Mohenjo-daro, Jhukar, Chanhu-daro, and Amri there are evidences of a gradual deterioration in the last phases of Harappan occupation. On the other hand, at Kot Diji, Naru Waro-dharo, Ghazi Shah, Pandi Wahi, and other sites, only one or two phases of Mature Harappan occupation are found, suggesting that these sites were abandoned quite rapidly. Indeed, Agrawal (1964, pp. 950–951; see also Agrawal, Kusumgar, and Sarna, 1964, p. 42), on the basis of radiocarbon dates, has indicated that the period covered by the Harappan civilization must be shortened considerably to fewer than the estimated 1000 years that are commonly given.

The evidence points to a precarious economic situation as a significant reason for the downfall of the third of the world's earliest civilizations. Even the great Punjab city of Harappa was abandoned after the Mature phase, as if the lessons of Sind had had no meaning. The administration of the Harappan cities was apparently ineffective in handling the problems. It may have been preferable to move away rather than to remain, which indicates that the rigid control by a theocratic or secular government, suggested by some authorities, was in fact largely non-existent. Raikes (1965) has stressed the theory of a rise in sea level from tectonic causes, producing a pooling of the waters of the Indus River in Sind, and thus causing the abandonment of Harappan settlements. However, it seems that the vagaries of a mature river in its flood plain would be sufficient to cause the abandonment of traditional sites.

## CONCLUSIONS

On the present evidence, the Harappan civilization cannot be said to have originated through direct or even stimulus contact with Meso-

potamia, even though civilization is earlier in the latter region. The evidence strongly suggests that a concentration of developed village settlements in the highlands of the Indo-Iranian Borderlands provided interactions that made for a constantly improving and intensified method of using local soil and water resources as well as advancing technology and creating social and political institutions necessary for civilized beginnings. The construction of dams and, with these, the fullest use of available land, the use of cattle for ploughing, the development of a mutually intelligible system of signs and symbols, the creation of local surpluses, which provided for the support of professional craftsmen, the institutionalizing of religious forms, and the development of domesticated animal breeds adapted to the ecology of the Borderlands (example: *Bos indicus*) are suggested as significant pre-Harappan advances in the highlands of the Borderlands. Essentially highland village cultures were the first to move into the Indus River Valley itself in pre-Harappan times. We do not know how long a period of experimentation and of minor settlement in the valley was involved. Absent from our evidence, for example, are the botanical data which would demonstrate the variety and number of changes necessary for the adaptation of highland or essentially Iranian varieties of cereal plants to the situation in the Indus River Valley. This had to be an essential of highland village settlement there.

The evidence indicates that settlement, once it occurred in the Indus Valley, was concentrated in northern Sind and on the slopes of the Khirtar Mountains at the western edge of the valley, whence it spread south and east. However, the largest concentration was on the southern borders of the great alluvial plain of Kachhi, where water was obtained from both the nearby drainage of Baluchistan or a branch of the Indus River emerging above Sukkur. Here occurred the characteristic style that we label "Harappan." The cultural florescence of the bearers of that style was rapid (probably no more than 200 years) and resulted in the creation of the great urban centers of Mohenjo-daro and, later, of Harappa.

It seems clear that the natural soil and water advantages of the Indus Valley made this florescence possible, i.e., the amplification of institutions already established. For example, a richer return per acre planted resulted in larger surpluses which in turn supported greater populations and permitted an elaboration of non-farming specializations. Thus the village priests became a priesthood, the metallurgist became one of many, as did the potter, weaver, seal-cutter, and the like. More private buildings and larger public buildings were mandatory in such a situa-

tion. The use of fired brick instead of mudbrick in building foundations may have been a response to the challenge of the flood potential of the Indus Valley. Village silos became urban granaries. Village ablutions and dances became temple rites. In effect, these elaborations had been motivated at the village level and given foundation for development in the endless potential of one of the richest alluvial tracts on earth.

The Indus River Valley is a transitional part of the Indo-Pakistan zoogeographic province. Highlands farming cultures adapted to that ecology lost their Iranian aspect and emerged Indian in form, following whatever local population with which they were in contact. The Harappan civilization presents an almost totally non-Iranian quality. Factors still to be defined were at work. We question the reasons for the heavily ornamented female figurines, the painted bulls, the seal writing and seal motifs, the great drains in and among buildings, the town planning, the repetitive themes in pottery, toy carts, settlement pattern, ornamentation, and many additional traits—all of which are virtually unknown, or exist in other forms and shapes, on the Iranian plateau. Clearly motivations within the life of the time made the change from Iranian village patterns to Indian "urban" styles even more dramatic.

The evidence again demonstrates a failure to come to grips fully with what must have become an increasingly acute situation—the destruction of the local ecological patterns and the consequent failure of food resources. Everything we know about the civilization indicates that the bulk of the population moved away to the north and south, still generally maintaining the characteristic "urban" village patterns. The uniformity of Harappan village sites wherever they are known indicates both rapid movement away from the traditional homeland and the maintenance of what can only be called the folk order in the fullest Redfieldian sense. Here is the firmest clue that we have to the character of the Harappan civilization. We cannot envision the civilization as representing a vast empire with twin administrative capitals, a fully developed riverine commerce, and a flourishing sea and overland international trade, as some authorities suggest. The conformity of Harappan sites and associated artifacts argues for the full syncretization of foreign elements. The centralization of administrative control obviously required to build large structures, and to cultivate acreage, harvest, and store is not beyond the powers of an elaborated village administration, though certainly adjustments were necessary, for example, in recording storage quantities and noting flood levels. But there is no good evidence for priest-kings, slaves, courts of officials, and standing armies. When the Indus River Valley was overexploited and the return to man became

less than his needs, no massive effort requiring the concentrated energies of thousands of persons seems to have been made, unlike that at Sumer, where great irrigation canals were constructed as a means of broadening the economic base. The Harappans apparently did not expand their cultivated acreage much beyond the active flood plain, even though the richest alluvial lands were available to them beyond that plain. Instead, the population appears to have drifted away northward to the Punjab, southward to the sea, and eastward to the Ganges and Gujarat, leaving only a remnant population to live out their lives atop the ruins of the old farming "cities." By doing so, they were conforming essentially to the same pattern that had been followed by their Iranian forebears in the past millennia. It was a civilization with cities but was not, at least politically, a state. Thus, it was neither Sumerian-like nor Egyptian-like but stands forth unique in its civilized character.

The ultimate and perhaps most telling evidence bearing on the character and history of the Harappan civilization is Indian civilization itself. The concept of Redfield and Singer (1954; see also Redfield, 1953) of primary and secondary civilization provides theoretical reasons for this conclusion. On these terms the evidence we have indicates that a "great tradition" marked by both urban and rural elements evolved out of hybrid "little communities," characteristic of the pre-Harappan Indus Valley. These were not isolated elements but were interrelated; in the Mature Harappan stage of development they had been transformed into an indigenous or "primary" civilization in which village and city alike shared a common culture. Such contemporary cultures as the Kulli in Baluchistan are probably variations on the "great tradition."

Redfield's (1953, p. 67) concept of a folk order moral in character is applicable here: ". . . the naive moral order of the folk followed by the addition of a public and state-managed moral order with speculative intellectual development, accompanied or followed by more or less syncretism of foreign elements with native elements—is probably characteristic of the rise of any indigenous civilization."

Our evidence supports this statement in part. The elements of the folk culture found with settled life in the Borderlands are more characteristic of the Harappan civilization than the foreign traits that were received and duly absorbed.

Marriott (1955, pp. 75–228) has discussed the applicability of this concept to a small community in North India and its relation to the great tradition of an indigenous or primary civilization that is the Sanskritic

Hindu. He concluded in part: "Viewed from the perspective of Kishan Garhi, the villages which are the little communities of India today may be conceived as relative structural nexuses, as subsystems within greater systems, and as foci of individual identification within a greater field. They cannot be conceived as things in themselves in their organization of marriage and kinship, residence patterns, modes of conflict, or caste organization. Nor are they ever likely to have been conceivable as isolates since Indian civilization began. The traditional social structure of the greater community of India similarly cannot be understood as apart from its continuing existence in relation to hundreds of thousands of little communities. Both little communities and greater communities are mutually necessary conditions of each other's existence in their present forms. One must consider both in order thoroughly to understand either."

We cannot help but feel that the evidence presently at hand places the Harappan civilization firmly in its Indian sphere. More than that, its institutions may in all probability lie at the very base of the Indian cultural continuum. The archeological evidence proves how much was shared by rural and urban communities as early as 2000 B.C. It also indicates how widely the Harappan cultural forms were dispersed. Marriott's conclusions bearing upon the complex but nonetheless formal and definite unities that are part of the Indian ethos are suggested by our evidence. On this basis perhaps we must turn more firmly to the Harappan civilization to view the origins of at least some major traits of Indian civilization. Probably the great gap between this ancient civilization and medieval India that we are prone to emphasize does not exist. If we direct our attention to these possibilities, we may be able to define far more of India's beginnings than has hitherto been possible. In any case, our efforts must be directed even further afield to understand the Harappan civilization on its Indian terms.

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